Docket No.. 6009-4611

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	09/889,942	Confirmation No.: 4597
Applicant	:	Yrjö Leppänen et al.	
Filed	:	October 15, 2001	
For	:	CASTING MOULD FOR MANUFACTURING A COOLING ELEMENT AND COOLING ELEMENT MADE IN SAID MOULD	
TC/A.U.	:	1742	
Examiner	:	Scott R. Kastler	
Docket No.	:	6009-4611	
Customer No.	:	27123	

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Sir:

☒ Transmitted herewith in triplicate is the Appeal Brief for Appellant(s) which is due on March 9, 2004. The Notice of Appeal was filed on January 8, 2004.

☐ Transmitted herewith in triplicate is the Reply Brief for Appellant(s) which is due on _____. The Examiner's Answer was mailed on _____.

☐ Transmitted herewith in triplicate is a Supplemental Brief for Appellant(s) which is due on _____ in response to the Office Action reopening prosecution on _____. Appellant(s) hereby request that the appeal of the above-identified application be reinstated.

☐ A Petition and Fee for Extension of Time to extend the term for filing the ☐ Appeal Brief ☐ Reply Brief ☐ Supplemental Brief is enclosed.

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Respectfully submitted,

Dated: March 9, 2004

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APPELLANT'S APPEAL BRIEF PURSUANT TO 37 C.F.R §1.192

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Sir:

Pursuant to the provisions of 37 C.F.R. § 1.192, Appellants hereby appeal the pending final rejection of claims 1, 2, 4 and 7-10, as stated in the September 9, 2003 Office Action.

(1) Real Party In Interest

The real party in interest in this appeal is Outokumpu Oyj, the assignee of the inventors.

(2) Related Appeals And Interferences

None.

(3) Status Of Claims

Claims 1, 2, 4 and 7-10 stand pending in this application. Claim 1 is the independent claim.

Claims 1, 2, 4 and 7-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Great Britain 1,386,645 ("GB '645") in view of U.S. Patent No. 4,252,178 to Hudd ("Hudd '178").

Therefore, the claims on appeal are Claims 1, 2, 4 and 7-10. An appendix showing the text of the appealed claims is attached.

(4) Status Of Amendments

On September 9, 2003, an Office Action was issued that made final the rejection of Claims 1, 2, 4 and 7-10.

Claims 1, 2, 4 and 7-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over GB '645 in view of Hudd '178.

In response, Appellants filed on November 10, 2003 a Request for Reconsideration under 37 CFR §1.116. An Advisory Action dated December 8, 2003 entered the Request for Reconsideration under 37 CFR §1.116 for purposes of appeal.

On January 8, 2004, Appellants filed a Notice of Appeal to the Board of Patent Appeals and Interferences.

(5) Summary Of The Invention

Appellants' invention is directed to a casting mould formed of base, wall and end plates for manufacturing a pyrometallurgical reactor cooling element, the casting mould made of copper plates is at least partly equipped with cooling pipes, the mould being lined on the inside

with plates resistant to high temperatures, the plates resistant to high temperatures being fixed to the surface of the mould by means of underpressure.

(6) Issues

(a) Whether Claims 1, 2, 4 and 7-10 are patentable under 35 U.S.C. §103(a) over GB '645 in view of Hudd '178.

(7) Grouping Of Claims

Claim 1 is an independent claim. Claims 2, 4 and 7-10 stand or fall together with Claim 1.

(8) Argument

(a) Claims 1, 2, 4 and 7-10 Are Patentable Over GB '645 In View of Hudd '178

The Office Action of September 9, 2003 rejected Claims 1-2, 4 and 7-10 under 35 U.S.C. §103(a) as being obvious over GB '645 in view of Hudd '178. See Office Action, p.2.

1. The Office Action of September 9, 2003 Overstates the Teachings of GB '645

GB '645 describes a mould for a cooling element, the cooling element having a cooling pipe therein. A prefabricated metal pipe is inserted into a mould, into which molten metal is poured or has already been poured. This prefabricated pipe is cooled until the molten metal around it solidifies. See GB '645 at, for example, page 2, lines 34-60.

However, according to the Office Action dated September 9, 2003:

> GB '645 teaches, at page 4 lines 20-27 for example, that when casting copper cooling elements, it was known in the art at the time

> the invention was made to employ chill molds for the casting of the cooling elements, where the molds would have a base, walls and end plates, thereby showing all aspects of the above claims except the use of copper (rather than the cast-iron of GB '645) mold walls, cooling pipes or [a] graphite lining plates. Office Action, p.2.

The Office Action's argument that GB '645 teaches "all aspects of the above claims except the use of copper mold walls, cooling pipes or [a] graphite lining plates" erroneously overlooks other deficiencies of GB '645. More specifically, the Office Action's argument overlooks the fact that GB '645 also does not teach or suggest that the mould itself is equipped with cooling pipes or that the mould is lined with plates resistant to high temperatures which plates are fixed to the surface of the mould by means of underpressure, as recited in Claim 1.

2. The Office Action dated September 9, 2003 Erred in Applying the Teaching of Hudd '178 to GB '645

According to the Office Action dated September 9, 2003:

> Hudd ['178] teaches that when casting copper components, chill molds (shown in figure 1 for example) comprising copper plates or blocks (1) lined with graphite plates (2) and cooled with cooling pipes (4) provide improved durability and service life to the mold when compared to other types of copper casting molds (see col. 2 lines 23-55 for example). As stated in the instant specification at page 2 for example, graphite plates will inherently attach themselves to the copper walls by means of underpressure. Because improved durability and increased service life would also be desirable in the chill mold designed for copper casting described in GB '645, motivation to employ the chill mold materials described in Hudd ['178] when constructing the mold described by GB '645, in order to increase service life of the mold, would have been a modification obvious to one of ordinary skill in the art at the time the invention was made. Office Action, p. 2.

Contrary to the Office Action's argument, Hudd '178 does not cure the above-stated deficiencies of GB '645. Hudd '178 describes a continuous casting slab mould having a

body that is made of copper. The surfaces of the mold facing the melt are covered with a graphite slab liner (15). The graphite liner (15) is held close to the copper body by means of springs (20) and bolts (17). The bolts (17) attach to the graphite liner (15) by means of blind holes (16). The bolts pass through corresponding holes (18) in the copper body (1) and are provided with nuts (19) that compress coil springs (20) and pull the graphite liner (15) into proximity with the copper body (1), leaving a small gap between the copper body (1) and the graphite liner (15).

Hudd '178 does not teach or suggest the use of underpressure for any purpose, much less for attaching plates to a casting mould. The lining of Hudd '178 is not secured by means of underpressure so that the liner is fixed to the surface of the mould, as recited in Appellants' Claim 1. In contrast, the graphite liner of Hudd '178, as described above, is held in place by bolts and springs that resiliently bias the bolts outwardly to pull the graphite liner close to the copper body 1, leaving a small gap therebetween." See Hudd '178 at column 3, lines 40-43 and column 3, line 66- column 4, line 7.

In Hudd '178, the graphite plate and copper body are not in direct contact, but are separated by a gap that Hudd '178 describes is filled with helium. In Hudd '178, a hole with tapped inlet (31) is drilled in the copper body (1), which connects to groove (32) at the copper to graphite interface. Hudd '178 states, "[t]hrough this bore helium can be inserted to purge the gap between the copper and graphite to increase heat transfer across the gap." See Hudd '178, column 3, line 66- column 4, line 4. That is, not only is underpressure not used in Hudd '178 to attach heat resistant plates to copper plates, but in-fact, gas is actually inserted into a gap between the copper body and graphite plates of Hudd. Hudd '178's teaching of a gap between

the copper body and graphite plates and inserting gas into the gap does not teach or suggest, but teaches away from, the use of underpressure for securing such plates wherein there is no gap.

In attempting to apply Hudd '178, the Office Action improperly relies on a statement in Appellants' Specification at page 2, arguing "[a]s stated in the instant specification at page 2 for example, graphite plates will inherently attach themselves to the copper walls by means of underpressure." See Office Action at page 2, paragraph 2, lines 10-12. When viewed in context, the Office Action's reliance on this statement from Appellants' disclosure is clear error. The statement in context reads as follows:

> Now a casting mould has been developed for manufacturing a cooling element for a pyrometallurgical reactor to replace the previous sand casting. The casting mould is constructed from separate, highly thermo-conductive copper plates, of which at least some are water-cooled. Since the cooling element itself is in most cases copper, the construction plates of the casting mould should be isolated from the cast copper, and this occurs by lining the inner part of the mould with highly thermo-conductive material such as graphite plate, so that the parts of the mould attach themselves to the surface by means of underpressure. Graphite prevents the melt poured into the mould from sticking to the surface of the mould. The cooling element casting mould is advantageously provided with a cope, so the casting can be done in shielding gas. Prior to casting, the cooling pipes necessary for cooling water circulation that are going to go inside the cooling element are placed into the mould. This piping is preferably made of nickel copper pipe, because the melting point of Ni-Cu pipe is higher than the copper being cast around it and therefore there is no risk of the pipe melting during casting. Specification, p. 2, lines 17-32.

This statement is taken from Appellants' description of their invention. It is not part of Appellants' description of the prior art. It is wholly improper to rely on Appellants' description of their invention as a prior art teaching that supports a rejection of the claims under 35 U.S.C. §103. See In re Nomiya, 509 F.2d 566, 567, 184 USPQ 607, 612 (CCPA 1975) quoting In re Sponnoble, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1965). The proper

issue is whether the teachings of the prior art would, without the benefit of Appellants' disclosure, make the invention as a whole obvious. See In re Nomiya, supra. And absent the improper reliance on Appellants' disclosure, there is nothing in Hudd '178 or GB '645 that teaches or suggests the use of underpressure for any purpose, much less for attaching plates to the casting moulds as claimed by Appellants.

3. The Combination of GB '645 and Hudd '178 is Improper and Does Not Teach or Suggest Appellants' Invention

The Office Action also argues that "it would have been obvious to one of ordinary skill in the art at the time the invention was made" to employ the materials described by Hudd '178 in the construction of cooling element of GB '645 in order to "increase service life of the mold." See Office Action at page 2, last sentence. However, Hudd '178 teaches away from combination with GB '645, and Appellants respectfully submit that "[t]he level of skill in the art cannot be relied upon to provide the suggestion to combine references." See MPEP §2143.01 (citing Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308 50 USPQ 2d 1161 (Fed. Cir. 1999)).

Hudd '178 states, "Continuous casting moulds are, of course, totally different from ordinary moulds, in which metal is poured into the mould to fill it and solidification takes place within the mould." See Hudd '178, column 1, lines 18-21. That is, Hudd '178 teaches that his continuous mould is "totally different" from the type described by GB '645, in effect teaching away from the combination of these references. While the cooling element in GB '645 may at some point be used in a continuous process, the process described by GB '645 for manufacturing the cooling element is *not* a continuous process.

Even if GB '645 were to be improperly combined with Hudd '178, the combination would not teach or suggest Appellants invention, as claimed. The aforementioned gap of Hudd '178 would remain between a mold body and the graphite liner (15) in the

combination, and would not be "fixed to the surface" by means of underpressure, as claimed in Claim 1. Rather, the graphite liner would be attached, in the combination, by bolts and springs leaving a small gap therebetween.

The Office Action response to Appellants' argument misses the point. According to the Office Action dated September 9, 2003:

> [Appellants'] further argument that since Hudd employs other attachment means the graphite is not held to the mold walls by underpressure is not persuasive because the instant claims do not exclude the use of additional attachment means as well as the underpressure effect which, as statead in the instant specification, is inherent. Office Action, p. 3.

As explained above, it was clear error for the Office Action to rely on Appellants' own disclosure of the invention as prior art. Moreover, Appellants' claims require that the plates be affixed to the surface of the mould by underpressure which neither GB '645 or Hudd '178 teach or suggest.

For at least the above reasons, the combination of GB '645 and Hudd '178 does not teach or suggest a casting mould lined on the inside with plates resistant to high temperatures, "the plates resistant to high temperatures being fixed to the surface of the mould by means of underpressure," as claimed in independent Claim 1.

Accordingly, Claim 1 defines patentable subject matter over GB '645 and Hudd '178. Claims 2, 4 and 7-10 depend from Claim 1 and therefore also define patentable subject matter over GB '645 and Hudd.

Summary

For the reasons set forth herein, the rejection applied to Claims 1, 2, 4 and 7-10 under 35 U.S.C. §103(a) over GB '645 in view of Hudd '178 should be reversed.

Respectfully submitted,

Dated: March 9, 2004

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APPENDIX

APPEALED CLAIMS

CLAIM 1. (Previously presented) A casting mould formed of base wall and end plates for manufacturing a pyrometallurgical reactor cooling element, the casting mould made of copper plates is at least partly equipped with cooling pipes, the mould being lined on the inside with plates resistant to high temperatures, the plates resistant to high temperatures being fixed to the surface of the mould by means of underpressure.

CLAIM 2. (Previously presented) A casting mould according to claim 1, wherein the plates resistant to high temperatures are graphite plates.

CLAIM 3. (Canceled)

CLAIM 4. (Previously presented) A casting mould according to claim 1 wherein shaped pieces made of graphite or fire-resistant material are placed on the base of the casting mould.

CLAIM 5. (Canceled)

CLAIM 6. (Canceled)

CLAIM 7. (Previously presented) The casting mould according to claim 1, wherein said cooling pipes are arranged within a base plate of the casting mould to provide cooling of the casting mould.

CLAIM 8. (Previously presented) The casting mould according to claim 7, wherein said cooling pipes are additionally arranged within side and end walls of the casting mould to provide cooling of the casting mould.

CLAIM 9. (Previously presented) The casting mould according to claim 1, further comprising a cope to retain a layer of shielding gas over the surface of the mould, which layer prevents excessive oxidation of molten material when the molten material is poured into the mould.

CLAIM 10. (Previously presented) The casting mould according to claim 1, further comprising inserts placed into the cavity of the mould, the inserts being resistant to high temperatures and serving to create a corresponding negative shape in the cooling element to be cast.